

TO: Mary Cleaves  
Code 970, SeaWifs Project  
FROM: Steve McLaughlin, RAI  
MODIS Administrative Support Team  
SUBJECT: LANDSAT/SeaWifs Sun Times  
DATE: July 26, 1991  
CC: M. Mackie, L. Stuart, G Ressler

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This memorandum documents the information I presented to you during our telephone conversation on July 25, and provides some additional information. Maria Mackie, Locke Stuart, and I have been working to determine the amount of time that the SeaWifs satellite can be expected to spend in sunlight. The LANDSAT 5 satellite has a very similar sun-synchronous orbit, so its time-in-sunlight should be very comparable to what can be expected for SeaWifs. The LANDSAT satellite has an orbital period of 98.76 minutes. It has been empirically determined that during the course of a year its time of eclipse by the earth ranges from 31.75 to 33.75 minutes. This implies that the time in sunlight ranges from a minimum of 65.8% of an orbit to a maximum of 67.8%. Andre Dress at EOSAT (552-0153) is the original source of our information. He is the satellite power engineer and is also involved with other aspects of satellite operations. The information was transmitted to us by Jerry Cantrell (464-7461).

Because SeaWifs has a local time of overpass of 12:00 noon and LANDSAT has a local time of overpass of 10:00 AM, SeaWifs will spend a modestly longer time in eclipse. The accompanying diagram shows that geometry and a few simplifying assumptions can be utilized to achieve an estimate of the SeaWifs mean value of time-in-sunlight. The approximate satellite altitude of 710 km and earth radius of 6378 km imply that  $128.3^\circ$  of the  $360^\circ$  of an orbit are spent in eclipse. The mean time-in-sunlight is approximately 64.4%, which is only slightly less than that determined for LANDSAT.

Please let us know if we can be of any further assistance.

